

WHAT IS CLAIMED IS:

1. A stage apparatus comprising:  
a first stage, the first stage being arranged to define an interior space substantially  
5 within the first stage; and  
a first actuator, the first actuator being positioned substantially within the interior  
space, the first actuator further being arranged to drive the first stage in a first direction.
2. The stage apparatus of claim 1 further including:  
10 a first counter mass, the first counter mass being coupled to the first actuator,  
wherein the first counter mass is positioned substantially within the interior space.
3. The stage apparatus of claim 2 wherein the first counter mass includes at least one  
guide bearing, the guide bearing being arranged to facilitate movement of the first stage  
15 relative to the first counter mass when the first actuator drives the first stage in the first  
direction.
4. The stage apparatus of claim 2 wherein the first actuator includes a coil and a  
magnet track, the magnet track being supported by the first counter mass, the coil being  
20 supported by the first stage.
5. The stage apparatus of claim 1 wherein the first actuator is arranged to drive the  
first stage in the first direction through a center of gravity associated with the first stage.
- 25 6. The stage apparatus of claim 1 further including :  
a second stage assembly, the second stage assembly being supported by the first  
stage, the second stage assembly including a second stage and a second actuator, the  
second actuator being arranged to drive the second stage in a second direction.
- 30 7. The stage apparatus of claim 6 further including:

an interface plate, the interface plate being coupled to the first stage and the second stage assembly such that the second stage assembly is supported by the first stage through the interface plate.

5     8.     The stage apparatus of claim 1 wherein the first stage is a coarse stage and the second stage is a fine stage, the fine stage being arranged to support an object to be scanned.

9.     An exposure apparatus comprising the stage apparatus of claim 1.

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10.    A device manufactured with the exposure apparatus of claim 9.

11.    A wafer on which an image has been formed by the exposure apparatus of claim 9.

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12.    A stage device comprising:

        a first stage assembly, the first stage assembly including a first stage and a first actuator arranged to drive the first stage, the first stage being arranged to define an interior space therein, wherein the first actuator is arranged within the interior space; and  
20        a second stage assembly, the second stage assembly being coupled to the first stage assembly, the second stage assembly including a second stage and a second actuator arranged to drive the second stage.

13.    The stage device of claim 12 wherein the first stage assembly further includes a  
25    counter mass arrangement, the counter mass arrangement being arranged within the interior space and coupled to the first actuator.

14.    The stage device of claim 12 wherein the first actuator is arranged to drive the first stage along a first axis and the second actuator is arranged to drive the first stage  
30    along a second axis.

15. The stage device of claim 12 wherein the first stage is a coarse stage and the second stage is a fine stage, the fine stage being arranged to support an object to be scanned.

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16. The stage device of claim 12 wherein the second stage is arranged within a vacuum environment, and wherein the first actuator is arranged within a non-vacuum environment.

10 17. The stage device of claim 16 further including:  
an air bearing assembly, the air bearing assembly being substantially vacuum isolated, wherein the air bearing assembly is arranged to cooperate with the first stage assembly to substantially reduce leakage into the vacuum environment when the first stage is driven by the first actuator.

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18. An exposure apparatus comprising the stage device of claim 12.

19. The exposure apparatus of claim 18 wherein the exposure apparatus is part of an extreme ultraviolet lithography system.

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20. A device manufactured with the exposure apparatus of claim 18.

21. A wafer on which an image has been formed by the exposure apparatus of claim 18, wherein the second stage is arranged to support a reticle that is used to form the  
25 image on the wafer.

22. An apparatus comprising:  
a vacuum chamber arrangement, the vacuum chamber arrangement being arranged to provide a vacuum environment;

a first stage assembly, the first stage assembly including a first stage and a first actuator arranged to drive the first stage, the first stage having an interior section, the first actuator being arranged within the interior section, wherein the first actuator is substantially unexposed to the vacuum environment;

5 a second stage assembly, the second stage assembly including a second stage and an actuator arrangement arranged to drive the second stage, wherein the second stage is arranged within the vacuum chamber arrangement such that the second stage is exposed to the vacuum environment; and

10 an interface plate, the interface plate being arranged to couple the first stage assembly to the second stage assembly.

23. The apparatus of claim 22 wherein the first actuator is arranged to drive the first stage along a first axis and the second actuator is arranged to drive the second stage along at least one of the first axis and a second axis.

15 24. The apparatus of claim 22 wherein the first stage assembly further includes a counter mass arrangement, the counter mass arrangement being arranged within the interior section.

20 25. The apparatus of claim 24 wherein the actuator includes a shaft and a coil assembly, the shaft being coupled to the counter mass, the coil assembly being coupled to the first stage.

25 26. The apparatus of claim 22 further including an air bearing assembly, the air bearing assembly being arranged to reduce leakage into the vacuum environment when the first stage is driven by the first actuator.

27. The apparatus of claim 22 wherein the apparatus is an extreme ultraviolet lithography apparatus and the second stage is arranged to carry a reticle.

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- 28. An exposure apparatus comprising the apparatus of claim 22.
- 29. A device manufactured with the exposure apparatus of claim 28.
- 5 30. A wafer on which an image has been formed by the exposure apparatus of claim 28.